

## Circuit description for Transistor Portables

### M264, 266, 268 and 270.

All models use the same basic circuit, but M.270 has a tone control added. In Model 270 the ferrite rod aerial is made rotatable and the car aerial coupling coil L1 is not used.

The wave band coverage is:

Medium Wave 180 – 550 Metres.

Long Wave 1070 – 1870 Metres.

#### AERIAL CIRCUIT.

The ferrite rod aerial coil L2, which is tuned by C2 and trimmed by C1 on M.W., is coupled to the base of the mixer, TR1; (AF117), by L4 and L5 in series and the D.C. isolating capacitor C4.

On Long Wave L3 is connected in series with L2 and is also tuned by C2. Across L3 is C3 which maintains correct tracking between the L.W. aerial and oscillator circuits. Coils L2, L3, L4 and L5 are on the ferrite rod.

The car aerial coupling coil L1 resonates at approximately 170 metres when used with a car aerial with 4 feet of cable (capacity about 50 pf). This gives an increase in signal pick-up at the H.F. end of the medium wave-band and gives a low pass filter effect over the M.W. and L.W. bands, thus tending to reduce the amount of Short Wave pick-up by the aerial. (Note: this coil is not fitted on M.270).

#### OSCILLATOR CIRCUIT.

Feedback is obtained from collector to emitter of TR1 by coupling L6 and L7 together through L8, this being the tuned winding which on Medium Wave is tuned by C9. R4 appears across L8 through C8 and C7 on M.W., this keeps the oscillator voltage on M.W. similar to that on L.W. when L8 is shunted by C8, C7, C9 and C10.

Long and Medium wave trimmers are C7 and C10 respectively. Base bias is provided for TR1 by potential divider R1, R2. The emitter components R3, C5 stabilise the mixer in near class B operation. Shaped vanes are used on the oscillator section of the tuning gang to eliminate the need of a padding capacitor.

#### I.F. AMPLIFIER STAGES

The 470 Kc/s output of the mixer is tapped into the single tuned transformer T1 and is coupled by a link winding to the base of TR2 (AF117). Bias is provided by R7, R10, R15 and X2. D.C. stabilization is by R9, C14.

The collector is tapped into the primary of a double tuned transformer T2, and the base of TR3 is tapped into the secondary. Bias is derived by R11 and R12, and stabilization by R13, C19. The last I.F. transistor TR3 is connected to the detector diode X2 (OA90) by the single tuned transformer T3. The detected audio component is developed across R14 and passed to the volume control R16 by C23. I.F. filtering is done by C21, R15 and C20. The diode X2 and components C21 and R15 are fitted in the Screening Can of T3 to prevent harmonic radiation. The D.C. voltage produced is fed back through R15 and R10, decoupled by C20 and C13, to the base of TR2 for A.G.C. control.

The action of the complete A.G.C. circuit is as follows:—

With increased signal strength an increased positive voltage is developed at the 'cathode' of X2. This is fed through the filter networks R15 and C20, R10 and C13 to the base of TR2, causing the collector current to be reduced and hence the gain. As the current through R8 falls, the positive voltage on the cathode of X1 falls, thus reducing its back resistance, which in series with R5 appears across the tuned winding of T1. This causes a further reduction in gain and also prevents TR2 from over-loading. The Series resistor R5 prevents the diode from conducting too heavily in a forward direction on extremely strong signals. Capacitor C12 decouples any audio component developed across R8 due to the diode action.

#### AUDIO STAGES.

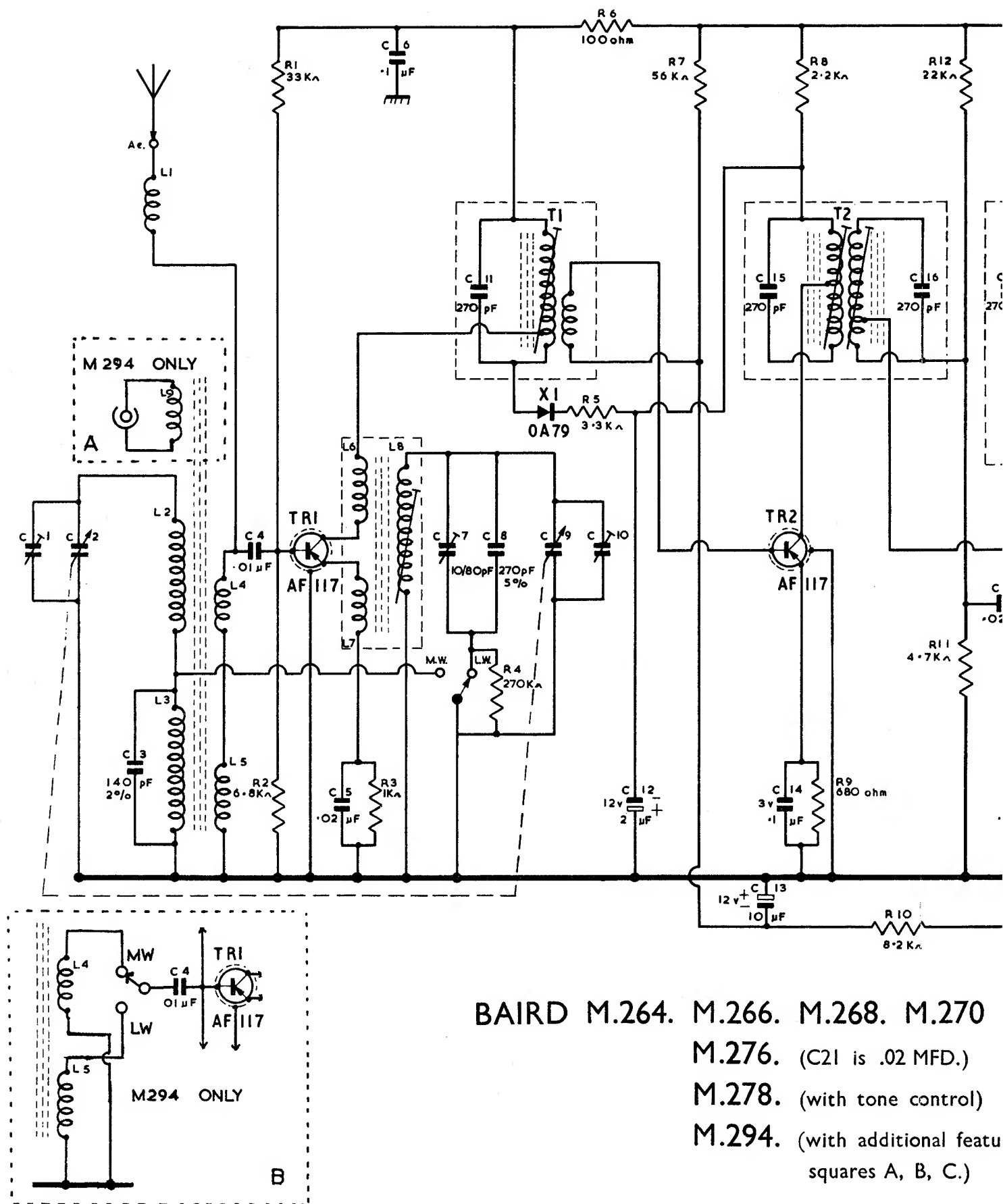
The audio output from the Volume control is fed by R17 'current feed' resistor, and C24 to the base of TR4 (OC81D). Bias is by divider R19 and R20 and DC stabilization by R22, R23 and C26.

Note: On Model 270 tone compensation is provided by the tone control circuit comprising R18, C25 and C30.

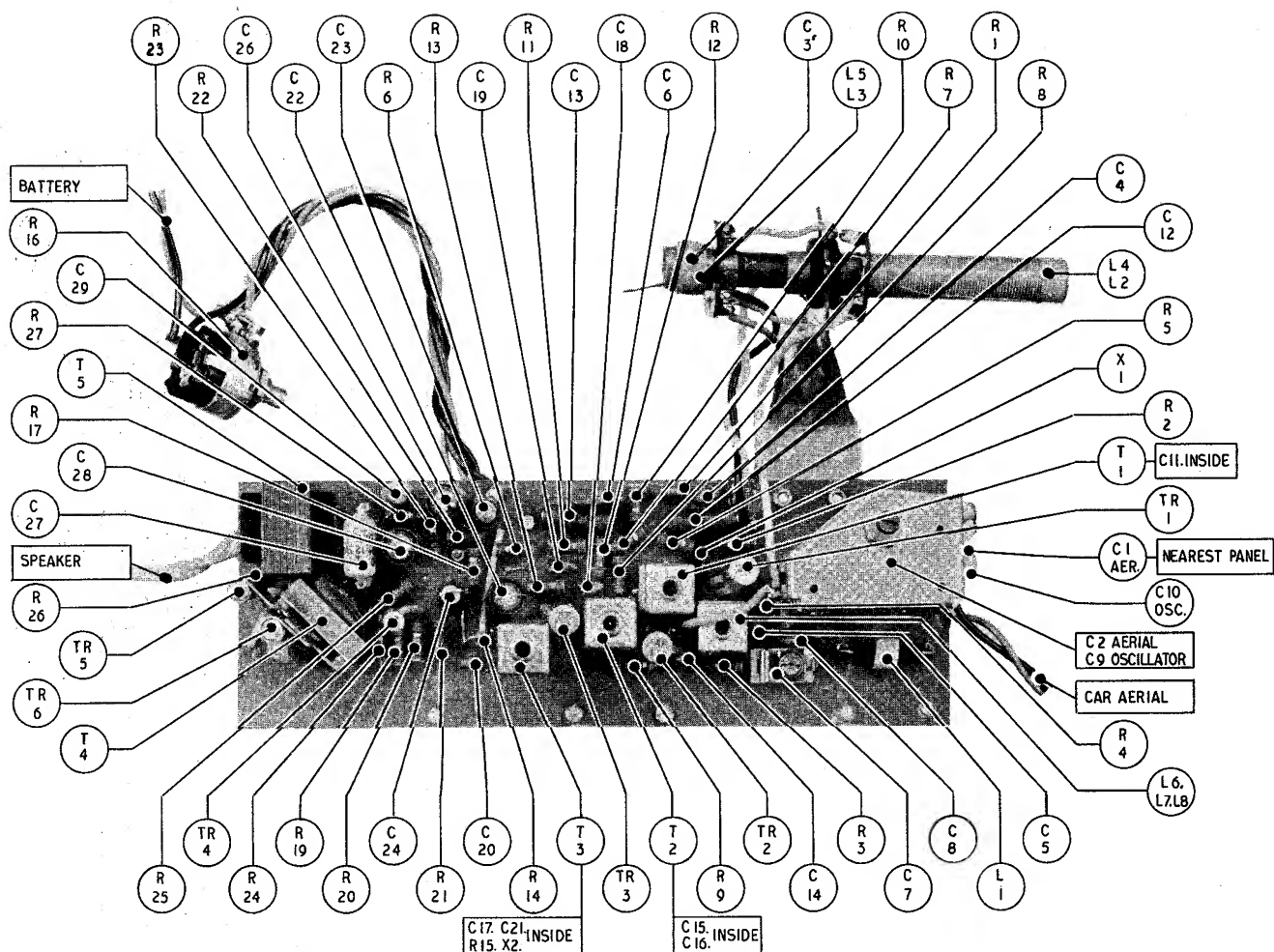
In the collector circuit is the transformer T4 which has a 'bifilar' push-pull secondary feeding current to the two bases of the matched-pair of output transistors (OC81's). Base bias is by R24 and R25, and DC stabilization by R26 (Class B). The collectors feed into a push-pull transformer T5 which matches the transistors to the speaker. In order to compensate for load changes due to frequency C27 is connected across the primary of T5. Negative feedback is applied from the secondary to the emitter of TR4, at the junction of R22 and R23, via a frequency selective network R27 and C29.

Decoupling is provided for the mixer stage by R6 and C6; for the I.F. stages by R21 and C22, and for the audio stage by C28. The by-passing action of C28 reduces the effect of battery ageing.

Sockets for a Tape Recorder are connected across T5 secondary on Model 270.





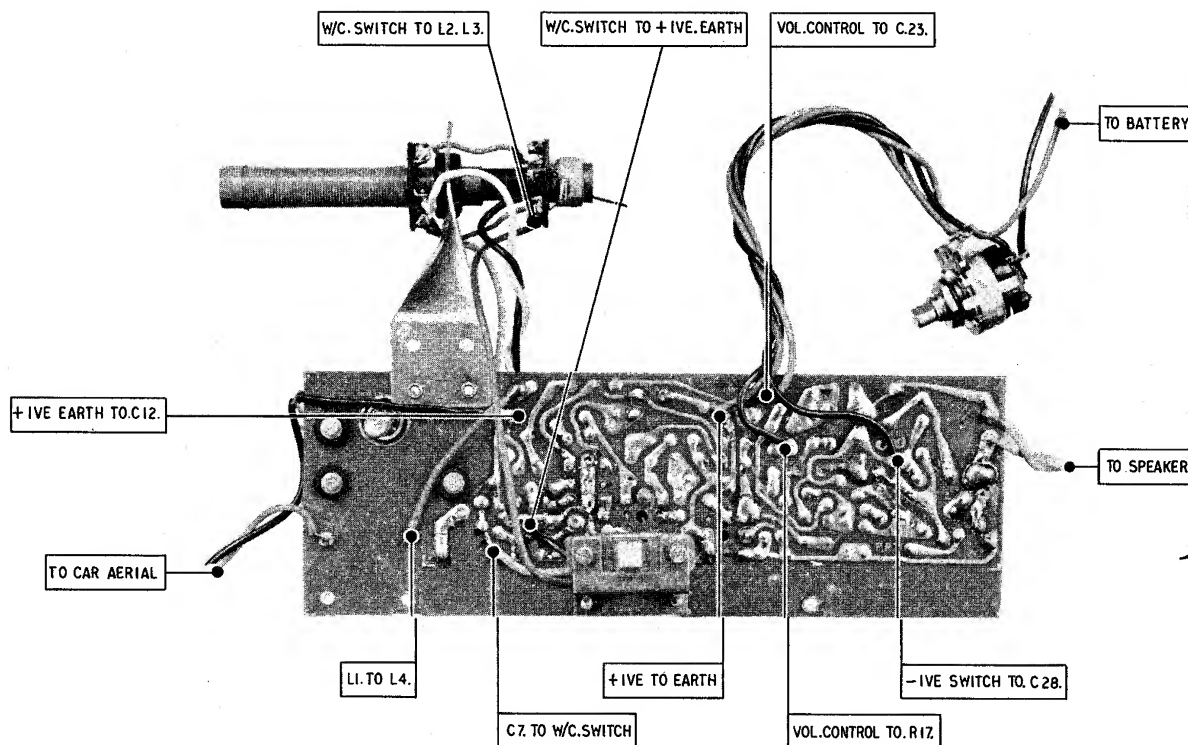


## CHASSIS LAYOUT DIAGRAMS OF MODELS

### VOLTAGE CHART FOR MODELS 264, 266, 268 AND 270

Voltages measured with Model 8 Avo Meter and with respect to positive chassis. (No signal.)

<i>Transistor</i>	<i>Collector</i>	<i>Base</i>	<i>Emitter</i>	<i>Collector Current</i>
Mixer & 1st IF AF117	6.8	1.1	1	1 MA
2nd IF AF117	4.8	0.85	0.7	1 MA
3rd IF AF117	7.0	1.1	1	1 MA
OC81D Driver	8.7	1.25	1.15	2 MA
OC81 each transistor.	9	0.2	0.05	3-4 MA



## 266 AND 268 USING PANEL PR7A

Alignment instructions Models, 264, 266, 268, and 270.

### I.F. Alignment.

Set tuning gang to fully meshed position ( $0^\circ$ ). Volume control fully clockwise. Wavechange switch to medium wave position. By means of a suitable loop aerial or by connection to the car aerial input, inject a 470 Kc/s 30% mod. signal. Increase output of generator until a reading is obtained at the speaker terminals, using either an output meter or an oscilloscope across the speaker terminals.

As the circuits are aligned the output of the generator should be reduced to a minimum (i.e. sufficient to give 50MW at the speaker).

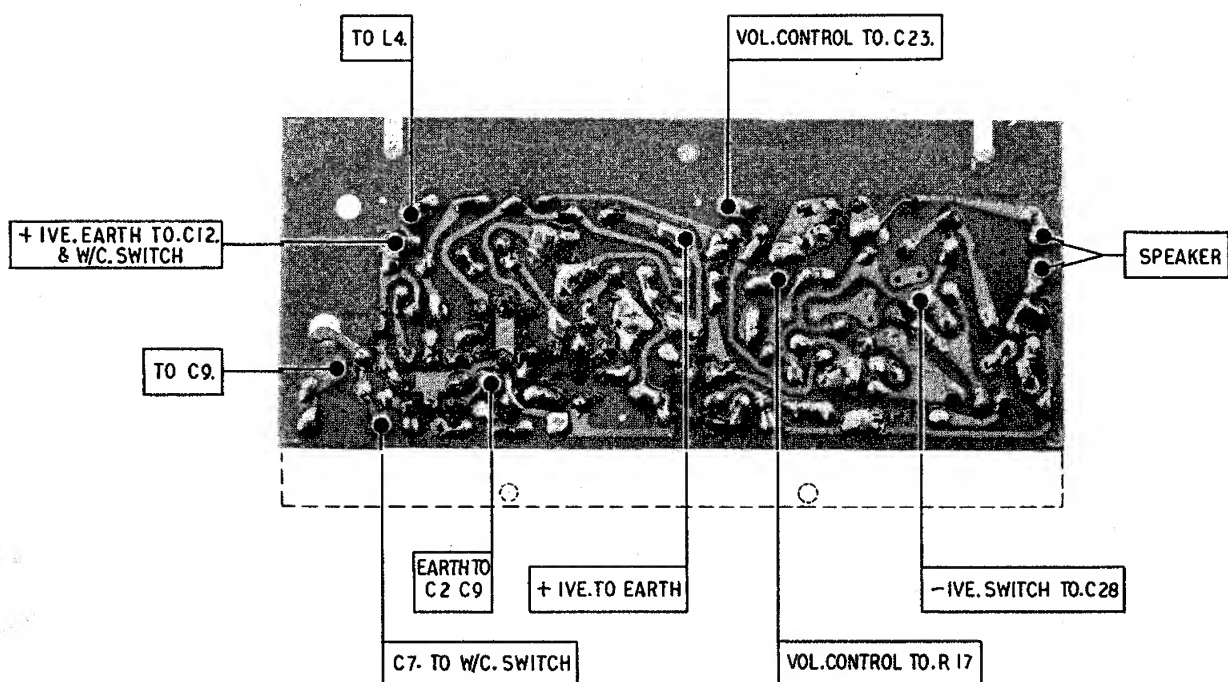
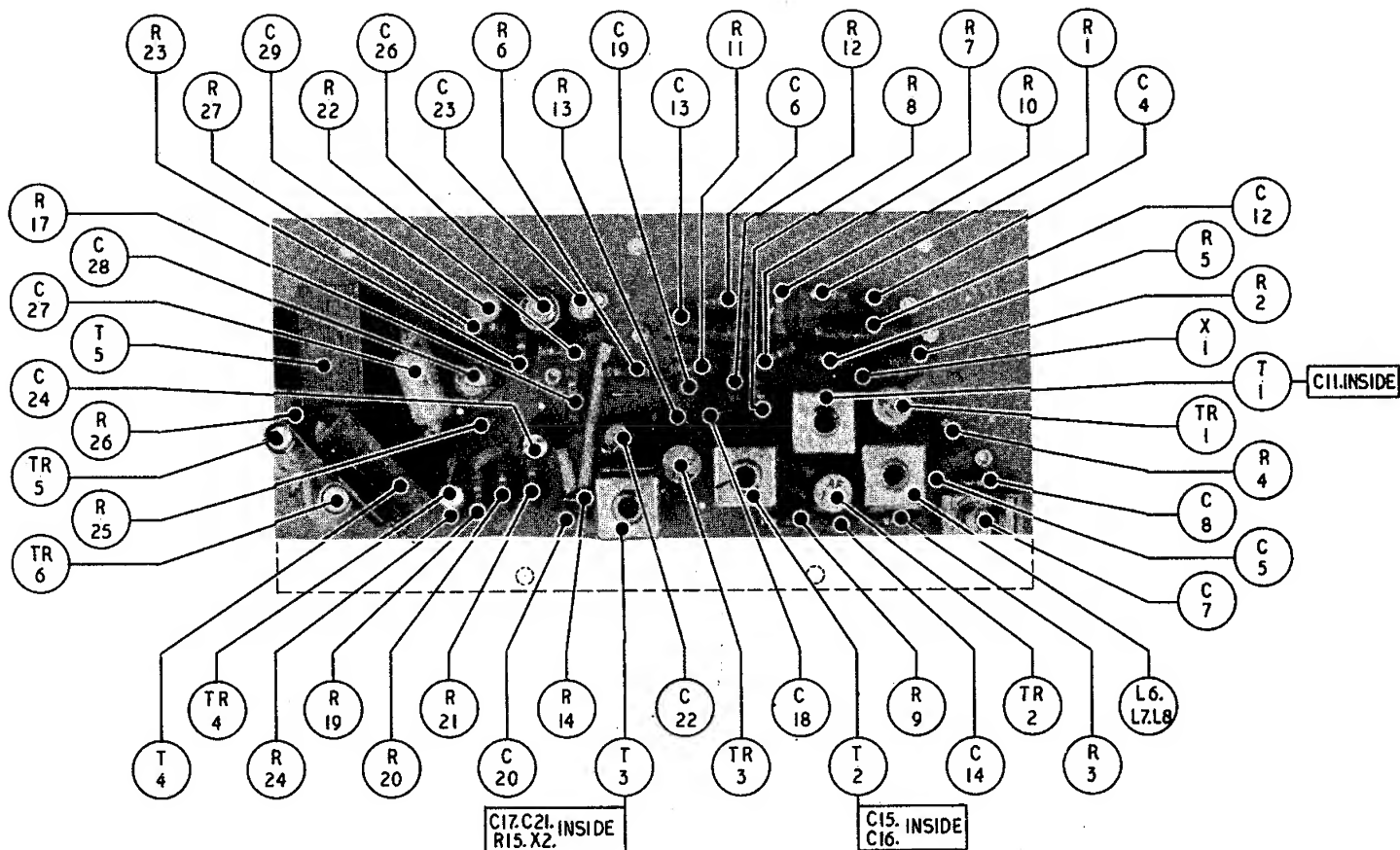
If this is not done, difficulty will be experienced in finding the max. tuning points due to the A.G.C. action, particularly in the case of T1 which is damped by the conduction of diode X1 on strong signals.

1. Adjust core of T3 for max. output, if more than one position is found giving max. output when the core is adjusted from the panel end, the last position is the correct one.
  2. Adjust the bottom core of T2 for maximum output.
  3. Adjust the top core of T2 for maximum output.
  4. Adjust the core of T1 for maximum output.
- Repeat above procedure to obtain maximum output.

### R.F. Alignment.

*Medium Wave.* Set the pointer to 500 Metres ( $26^\circ$ ). Inject a 600 Kc/s 30% mod. signal and tune the core of the oscillator coil (L6, 7, 8) until the signal is obtained. Move pointer to 200 Metres ( $154^\circ$ ) and adjust Trimmer C10 until the signal is obtained, adjust trimmer C1 for max. output. Repeat above procedure at least once, or until scale calibration is correct.

*Long Wave.* Move wavechange switch to Long wave position. Turn pointer to 1800 Kc/s ( $18^\circ$ ). Inject a signal of 166.6 Kc/s, tune in signal by means of trimmer C7 with a suitable insulated tool and adjust long wave coil on ferrite rod, for max. output.



**CHASSIS LAYOUT DIAGRAMS**  
**MODEL 264 USING PANEL PR7B**  
**MODEL 270 USING PANEL PR7C**  
 (Shown dotted)